THE ZOOLOGIST

No. 896.—February 15th, 1916.

ICTERINE WARBLER ON MIGRATION OBTAINED ON TUSKAR ROCK. WITH REMARKS ON THE STATUS OF THIS SPECIES IN THE BRITISH ISLES.

By Professor C. J. Patten, M.A., M.D., Sc.D.

In the February number of the 'Irish Naturalist' for 1915, p. 42, I published a preliminary note to the effect that I had received and identified an Icterine Warbler (*Hypolais icterina*), taken at Tuskar Light-Station, Co. Wexford. The bird was picked up dead on the rock at 7 o'clock a.m., on Wednesday, September 2nd, 1914, by Mr. Glanville, Principal Keeper. He knew that it was a strange bird, and I am deeply indebted to him for his care in preserving it in spirit for me until I returned from Australia seven weeks later. The following is an account of its bodily condition after I had removed it from the spirit and dried its feathers: Emaciation had proceeded to an advanced degree; the muscles were flabby and greatly wasted, the breast-bone was sharp and prominent, and all traces of adipose tissue had disappeared. The specimen weighed only 1 dr. 34 gr., having become reduced to about one-fourth of its normal weight. As the bird was in a rather poor state of preservation, many feathers over the rump and on the abdomen coming away on patches of peeling epidermis, and as the eyes were sunk in their sockets, one would have surmised that it had lain dead on the rock for some days before it was picked up. However, Mr. Glanville tells me that, in his opinion, it had been dead probably not longer than the previous night, adding that the weather was very warm at the time, and that the bird when he picked it up was apparently quite fresh. Assuming this to have been the case, it would appear that rapid decomposition must have set in very shortly after death, a state of affairs which I have noted in the case of several other emaciated birds obtained from light-stations.* The spirit in which the bird was immersed somewhat failed to fix the disintegrating skin adequately, hence the peeling of the epidermis above mentioned. Supposing, then, that this bird had been dead only since the previous hours of darkness, the inference that it struck the lantern and fell on the rock (killed outright or mortally wounded, so that it died before daylight) is exceedingly unlikely. And for two cogent reasons: Firstly, because of its starved condition, the wing-muscles in particular having undergone marked atrophy. For, having made post-mortem examinations on some hundreds of birds which met their death by striking the lantern, I have never found them—or at most with very rare exceptions—in any other than excellent condition, far fatter than when procured from their sheltered *natural habitat* at an intermigration period of their existence. Indeed, the accumulation of reserve adipose tissue, which is to be found on migrating birds, forms quite a remarkable and an interesting feature. And this holds good for rare migrants as well as for those which visit the lanterns regularly in abundant numbers.† Secondly, because there were no signs whatever of injury on the body, whereas birds which collide with the lantern‡ almost invariably display marks of violence, oftentimes extensive in character.

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* Fat birds invariably keep better than emaciated ones, often resisting decomposition for a very considerable time, and fat small birds when soaked in spirit for some days will keep almost indefinitely.

† *Vide* my articles on "Asiatic Skylark on Migration," 'Zoologist,' September, 1913, pp. 333–336; also "Aquatic Warbler on Migration," *ibid.*, March, 1915, pp. 81–92.

‡ Owing to the swiftness of flight and the small resistance which such a thin medium as air offers, birds are liable to damage themselves badly should they collide with any resisting object. I have examined many birds which lost their lives through striking telephone-wires, flagstaffs, weathercocks and other objects on pinnacles, and found great lacerated wounds and extensive fractures of limbs, beak, and skull.

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On the morning on which the Icterine Warbler was picked up, the weather happened to be fine, though somewhat misty. Furthermore, it was calm, the wind only registering the force of a gentle breeze according to Beaufort's scale. Nor did the meteorological returns show that a rough phase of weather had existed during the days immediately preceding. From this important point in the analysis of the weather report we may argue *a fortiori* that the bird was not driven by rough weather and high winds to alight directly on Tuskar Rock, only to die almost immediately after its arrival. I have seen many storm-driven birds alight on this rock when I resided there for the purposes of studying bird-migration. They, for the most part, arrive in daylight during a gale. They generally appear to be in good condition and vigorous, and move about on the rock in as lively a manner as the rough weather will permit. They tell us, as it were, that they have not been carried far out of the course from whence they started, or, at all events, from their last halting-site *en route*.* And such birds generally manage to get away clear when the wind abates, and even in the event of being detained for a considerable period through adverse weather, they may, at any rate in the warm months of the year, eke out a precarious subsistence for a while on flies attracted to the rock by the lightkeeper's victuals or by decaying sea-weeds or other refuse. But owing to the difficulty in obtaining fresh water † and the absence of shelter afforded by wood or glade, these little land-birds soon begin to part with their vigour on the bleak marine rocks, and, in their eager endeavours to move away, find themselves becoming so deprived of wing-power that they are unable to effect other than local trips. Hence we find them, shortly after setting out, alighting again on the nearest vantage-ground—namely, another rock—and this movement is repeated until having visited two or three of these inhospitable retreats the waifs eventually succumb. Now I believe that the Icterine Warbler, which forms the subject-matter of this paper, comes under the category of a migration waif, which, separated from its companions, had drifted aimlessly, and then becoming fatigued, was forced to alight; and it is likely that it made more than one attempt to reach the goal of its destination. Originally, of course, it may have been wafted from its accustomed migration route by stress of weather; however, there is little reason to doubt that it had sojourned at other rock-islands before it arrived on Tuskar, its last resort, where, in a starving state, it died a few days, or perhaps only one day, subsequent to its arrival. Had the bird been perambulating for any length of time alive on the rock, I feel quite sure that Mr. Glanville would have detected its presence, for few birds have escaped his sharp eye, and I know that, over and over again, he has proved himself, aided by his telescope, capable of identifying many of the small and sombre-plumed Warblers. From the written observations which he has very carefully compiled and kindly forwarded to me, it would appear that no birds visited the lantern on the night preceding the morning on which the Icterine Warbler was discovered. Furthermore, except for the presence of some Wheatears and a few Dunlins at the lantern on August 31st (two of the latter being found dead on the rock on the morning of September 1st), no migratory move was witnessed since August 16th, when Wheatears, Willow-Warblers, Sedge-Warblers, Spotted Flycatchers, a Pied Flycatcher, and a Corn-Bunting were identified at the lantern. The only other birds which Mr. Glanville observed on the rock at the time when he picked up the Icterine Warbler were two Yellow Wagtails; both were vigorous and winged their way westward after a halt of half an hour. All these points indicate that this Icterine Warbler probably arrived on the rock *alone*, or, at the most, it may have fallen in with a few passing diurnal migrants. It may be suggested that it accompanied the muster of birds which appeared round the lantern on August 16th, that it was then vigorous and fat, but having become slightly injured, it remained on the rock for a fortnight, when it died. But this notion may be dismissed when we remember that the bird was on no occasion seen alive by Mr. Glanville, and it should be borne carefully in mind that injured birds, as they gradually grow weaker and lose vigour, become consequently much tamer, and so betray their presence to a remarkable degree. Moreover, as before mentioned, there was absolutely no mark whatever on the body to indicate that the bird had struck the lantern.

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* I have good reason for believing that many of the smaller land-birds, in making long journeys, draw up to rest and refresh themselves several times *en route*.

† The fresh water for human use is conserved in tanks with closed lids.

In regard to the particulars which I made out from an examination and a dissection of the body, in addition to the general bodily condition already described, they are as follows: Total length, 12·8 cm.; wings, 7·62 cm., both being of the same length; bastard primary, 1·1 cm.; tip of wings to tip of tail, 1·4 cm.; tail, 5·5 cm.; feet, 2·2 cm., leaden-colour, toes similar, nails dirty white in colour; beak, 1·1 cm; almost the entire lower segment, light yellowish-brown in colour; the upper segment, brownish. Weight, 1 dr. 34 gr. Condition, markedly emaciated. Sex, female. Age, immature. Plumage, first autumn, bright and clean. Gizzard, quite empty.

SUMMARY OF PREVIOUS OCCURRENCES OF THE ICTERINE WARBLER IN THE BRITISH ISLES.

This Icterine Warbler from Tuskar Rock is the first of its kind which has been procured from an Irish light-station, and is the second Irish specimen which has been authentically recorded. The first bird was collected as long ago as June 8th, 1856, at Dunsinea, Co. Dublin, by Mr. J. G. Rathborne, who presented it to the National Museum, Dublin, where it is now preserved.* Fifty-eight years and three calendar months less six days therefore elapsed between the capture of these two Icterine Warblers. Nevertheless, the great rarity of the species in Ireland must not be regarded as absolutely conclusive on the mere evidence of only two birds being obtained at very long intervals. Reference to this point will be made again more fully, in dealing with the status of the species as an Irish bird.

The occurrences in Great Britain, though by no means numerous, are much more so proportionately than those which have taken place in Ireland. They are as follows: One obtained near Dover, Kent, on June 15th, 1848; one obtained at Blakeney, Norfolk, on September 11th, 1884; one obtained at Newcastle-on-Tyne, Northumberland, on June 20th, 1889; one obtained at Holderness, Yorkshire, on May 28th, 1891; one obtained at Wells, Norfolk, on September 4th, 1893; one obtained at Cley, Norfolk, on September 7th, 1896; and one obtained at Burwash, Sussex, on April 30th, 1897. The above instances are taken from Saunders's 'Manual of British Birds,' second edition, 1899, p. 75. The following occurrences have been recorded after the publication of Saunders's manual: One obtained at Cromer, Norfolk, on September 5th, 1899 (E. C. Arnold, 'Zoologist,' 1899, p. 475); one obtained at Blakeney, Norfolk, on September 18th, 1903; and one seen on September 26th, 1905 (J. H. Gurney, 'Zoologist,' 1904, p. 209, and *ibid.*, 1906, p. 134); one seen by Mr. A. Napier, near Holkham, Norfolk, on September 20th, 1903 (J. H. Gurney, 'Zoologist,' 1904, p. 212); one seen at the Kentish Knock Lightship on September 22nd, 1903 (W. Eagle Clarke, *ibid.*, 1904, p. 136); one, a male, obtained near Rye, Sussex, on June 26th, 1905 (J. B. Nichols, 'Zoologist,' 1905, p. 349); one, a female, obtained at St. Catherine's Lighthouse, on September 29th, 1905 (H. F. Witherby, 'Bulletin of the British Ornithologists' Club, vol. xvi, p. 23). The above instances have been gleaned from a paper in 'British Birds,' vol. i, p. 83, by Mr. Witherby and Dr. Ticehurst, entitled, "On the more Important Additions to our Knowledge of British Birds since 1899." Still later notices of the occurrences of this Warbler in Great Britain are as follows: One obtained at Cley, Norfolk, on September 12th, 1907 (E. C. Arnold, 'British Birds,' vol. i, 1907–8, p. 226); one obtained at Fair Isle in autumn, 1908 (W. Eagle Clarke, 'Annals of Scottish Natural History,' 1909, p. 73); one obtained at Lerwick, Shetland, on May 15th, 1910 (G. W. Russell, 'Annals of Scottish Natural History,' 1911, p. 183); one, a female, obtained at Wells, Norfolk, on September 13th, 1911 (F. Penrose, 'British Birds,' vol. v, 1911–12, p. 188); three recorded at Fair Isle, between June 3rd and 5th, 1911 (W. Eagle Clarke, 'Studies in Bird Migration,' vol. ii, p. 133).

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* Ussher, 'Birds of Ireland,' 1900, p. 23.

N.B.—These last three records from Fair Isle are chronologically earlier than the record made by Mr. Penrose for Wells, Norfolk, but were published at a later date. One recorded at Fair Isle on August 5th, one on August 10th, two on August 21st, and one on August 22nd, 1912 (W. Eagle Clarke, 'Scottish Naturalist,' 1913, p. 28); one recorded at Fair Isle on May 26th, 1913 (W. Eagle Clarke, 'Scottish Naturalist,' 1914, p. 54); one, an immature male, obtained at St. Leonards-on-Sea, Sussex, on August 26th, 1914 (H. W. Ford-Lindsay, 'British Birds,' vol. viii, 1914–15, p. 146); two, a male and a female, obtained at Pentland Skerries, Orkney, on June 10th and 11th, 1914 (J. Bain, 'Scottish Naturalist,' 1914, p. 237); one obtained at Fair Isle, on June 11th, 1914 (W. Eagle Clarke, 'Scottish Naturalist,' May, 1915, p. 104). The sex of the last bird—viz. a female—is given in the 'Report of Scottish Ornithology in 1914,' in a conjoint paper written by Miss Baxter and Miss Rintoul ('Scottish Naturalist,' July, 1915, p. 195).

N.B.—The records from Orkney and the most recent from Fair Isle are chronologically earlier than the records made by Mr. Lindsay for Sussex, but were published at a later date.

It may be seen from the above statistics for Great Britain, that during a period lasting sixty-six years—viz. from 1848, when the first bird was obtained, to August, 1914, when the latest bird to date was obtained—thirty-one examples have been duly recorded, all of which, with the exception of three, have been handled and identified beyond doubt.

In Ireland we have seen that only two authentic records have been made during a period of fifty-eight years and almost three months, *e.g.* from June, 1856, when the first bird was obtained, to September 2nd, 1914, when the second and only other bird known at present was procured.* Taking all the records for the British Isles, thirty-three in number, we find that the first bird was obtained at Dover in 1848, the latest to date at Tuskar Rock on September 2nd, 1914.

STATUS OF THE ICTERINE WARBLER AS A BRITISH BIRD.

Following the line of argument which I have adopted in regard to the status of the Aquatic Warbler as a British Bird†—

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* Excluding the record of a bird seen by Rev. A. Ellison on May 29th, 1886, at Coollatin, Co. Wicklow, and believed to have been an Icterine Warbler; but this bird was not brought to hand.

† *Vide* my article on "Aquatic Warbler on Migration, obtained on Tuskar Rock," 'Zoologist,' March, 1915, pp. 82–92.

a line of argument applicable in considering the status of many other birds which visit us—it is true that, while the Icterine Warbler may be classed as a rare visitor to our Isles, it has, nevertheless, been overlooked to a considerable extent, and its greater rarity, as disclosed by the earlier records, has been apparent rather than real.* The greater frequency of the appearance of the bird in latter years, as compared with the more lengthened periods which elapsed between the dates of occurrences of the earlier specimens, notably between the first and second, depends largely upon the fact that, not only has the study of ornithology found more favour of late, but also that many more workers have made a special study of migration, and have selected the very best types of observatories—I mean light-stations built on rocks or small islands some miles off the coast, and situated so as to lie along and often to intersect important migration-routes. Now, apart from the fact that the lighthouse is a very great asset, in that it attracts birds, it is also highly important to note that, whether these birds descend from the lantern at night to the rock, as I know many undoubtedly do, or alight in daylight *independently of the existence of the lantern*, owing to the small compass of ground, bleak and devoid of foliage and other natural cover, it is a difficult matter for a migrant, when it arrives, to escape betraying its whereabouts; even when in hiding in a rock crevice it can with ease be dislodged and made repeatedly to show up at these excellent observatories. Obviously it is more difficult to make sure of the identity of birds which touch on the mainland, for should they not take wing at once, they quickly make for cover, through which they can thread their way for long distances without being dislodged. And so, outstripping the range of the observer, they soon become lost in the interior of the district.

* Saunders regarded the Icterine Warbler as "only a very rare visitor to England and Ireland," it being, at the time he wrote, as yet undiscovered in Scotland. I should suggest modifying his sentence somewhat as follows: A visitor on passage in small numbers during the spring and autumn migrations to the southern and eastern seaboards of Great Britain, and probably occurring annually. Seemingly much rarer in Ireland, and occurring probably as a westward straggler from its regular migration fly-lines. Has in all likelihood been overlooked to a greater extent proportionately than in Great Britain.

As an example of the good work that is being carried out at light-stations, that which is being prosecuted by Mr. Eagle Clarke stands out prominently. Before this zealous ornithologist took up the studies of migration on Fair Isle, not only was the Icterine Warbler unknown in Scotland, but, if we allowed ourselves to be guided solely by records, it would seem that the species showed a preference for the section of Great Britain which lies between the counties of Norfolk and Sussex. But from a study of its geographical distribution,* there is no valid reason on the bird's part to show why it should confine itself in the main to this circumscribed area when touching on the British coast. The bird was recorded more often here than elsewhere doubtless because there were relatively more observers. But that the Icterine Warbler has passed along a considerable part of the eastern seaboard of Great Britain is shown by the capture of a specimen in Yorkshire and another in Northumberland. If to these we add the records of its visits recently made to Orkney and Shetland, we find that its British distributional area on migration is very wide; occupying in fact, the extreme length of the eastern seaboard from Dover to Shetland. And no doubt the gaps, still existing, in the bird's occurrences between Northumberland and the north of the Scottish mainland are only apparent, and will be filled up by records of *actual* specimens obtained as time goes on; indeed, it is no mere hypothetical idea to assume that this Warbler has already more than once visited intermediate points on the eastern sea-coast of Scotland. Such visits to our coastlands are to be expected, even though they be in small numbers, for the birds which reach us are regular members of the western fringe of migrants, which, without any undue detachment from the main body, pass up annually far beyond our latitudes to breed in Scandinavia, penetrating into the Arctic circle in Norway. A glance at the general geographical distribution † of the Icterine Warbler, as it pushes north to breed, shows that, *inasmuch as it is common within sight of our shores—e.g.* in parts of France, Belgium, and Holland—it can hardly avoid touching the east coastlands of Great Britain; and so it is fair to put forward the argument that the bird has been largely overlooked. Furthermore, we cannot

[*] *Vide* p. 53.

[†] *Ibid.*

regard the bulk of the actual occurrences as representing those of mere autumn, immature, inexperienced, straggling birds, carried westward by adverse weather, because this species has occurred many times both on its vernal and autumnal migrations, and in vigorous condition.

Mr. Eagle Clarke's discovery of the Icterine-Warbler on Fair Isle is highly interesting, not only because he shows us that the bird "has occurred annually on the island during recent years in spring or autumn or both," * thereby making its periodic status in all likelihood that of an annual visitor on passage in spring and autumn, but also because he shows us that the bird, when affecting migration-phases lasting several almost consecutive days, made its appearance on some of these days in the plural number, proving conclusively that it cannot be a mere accidental wanderer. And the appearance of two Icterine Warblers, a male and a female, almost synchronously at Orkney, fortifies this last argument. The complete status of the bird, therefore—periodic and numeric—as far as Fair Isle is concerned, might read somewhat thus: An annual visitor on passage in spring and autumn in small numbers; but at the same time I wish to point out that I have founded this status for the Icterine Warbler at Fair Isle with all due deference to Mr. Eagle Clarke's opinion, for it is he who has furnished us first-hand with the interesting data, having conducted his investigations personally. I desire merely to generalise as the result of a very keen interest taken in this point. I am fully in accord with Mr. Eagle Clarke's remarks, that the "species largely escapes notice as a bird of passage along the British shores." †

The extreme paucity of records of the bird's occurrence in Ireland—only two in all—as compared with those not only of England but also of Scotland, is somewhat puzzling. Undoubtedly the disproportion is, to a large extent, to be explained by the fact that workers in the field of Irish ornithology have, all along the line, been lamentably few. As seen, the records extend over very long intervals of time; albeit from this fact alone, one must not, as before stated, hastily conclude that

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* "Notes on the Migratory Birds observed at Fair Isle in 1914" ('Scottish Naturalist,' May, 1915, p. 104).

† *Ibid.*

in Ireland the bird is extraordinarily rare. But it does seem strange, however, that, in comparatively recent years when work at Irish light-stations has been receiving such special attention, no other specimen, save the one which I have been sent, has been recorded from a light-station. One hardly can expect to carry much conviction by advancing the argument that the sombre plumage of the Icterine Warbler and its close resemblance to a large Willow-Warbler diminished its value in the eyes of the light-keeper to such a degree that he did not consider it worth his while collecting and forwarding it for identification, especially when we remember that its near ally, the Melodious Warbler, very like it in plumage, together with several other rare plain-coloured Warblers, has been obtained, as recorded by the late Mr. Barrington.* Still, there may be something to be said in favour of the argument that, when a rare species bears a close resemblance to a very abundant species, the former is apt to be, at least occasionally, cast aside as of no value. A case in point is to be found in that of the Meadow- and Tree-Pipit. No doubt the latter must have been quite overlooked until I pointed out to the Tuskar keepers that, omitting minor details, the only main distinction was to be found in the difference in the length and curve of the hind-claw, and that the foot of every Pipit captured should be submitted to a very careful examination. Since 1912, when I first discovered the Tree-Pipit at Tuskar Light-station, Mr. Glanville, who is greatly interested in the differential diagnosis of species, and to whom I pointed out the differences in the two species as I held the actual dead birds in my hands, has sent me evidence to show that the Tree-Pipit has occurred at that light-station annually since its discovery. All the same, it is natural that the brighter and more definitely-coloured and varied-plumed birds would run less risk of being overlooked by the light-keepers. But to return to the point in particular regarding the rarity of the Icterine Warbler in Ireland: there is one question, however, which, by way of trying to elucidate the matter, may be put forward, namely, What is the behaviour of the Icterine Warbler at the lantern? Does it, like the Whitethroat, Sedge-Warbler, and many other species, *strike* in the strict sense of the word, making a loud tap on the glass, and thereby arrest the attention of the light-keeper so that he goes out on the balcony and picks up the specimen at once? or does it come in quietly, like a Robin or Goldcrest, and then flutter up and down the glass, disappearing in a short time by descending to the rock or elsewhere? or does it, on reaching the lantern, skulk, after the fashion of a Grasshopper-Warbler or a Wren, on a window-sash, hand-rail, or other perch during the hours of darkness? For if it in a characteristic manner adopts any other than the first measure, it is much more likely to escape being captured by the keeper, whose duties on his watch prevent him from always being on patrol out on the balcony. From personal observation I have ascertained that different species behave very differently when under the influence of the luminous beams.* But, lastly, let us remember that, on the other hand, while granting that the bird must have been overlooked, not only at light-stations but also on the mainland because of the inadequate numbers of contemporaneous workers always in Irish ornithology, it may yet be proved, should ornithology ever be studied more extensively in Ireland, that the western limits of the Icterine Warbler's migrations are, like those of the Nightingale, sharply marked off, in other words, that they are strictly adhered to, and that Ireland, lying beyond—*i. e.* west of the fly-lines—is, in reality, very exceptionally visited, most probably by stragglers wafted out of their course. Finally, as above mentioned, the Icterine Warbler received from Tuskar Rock was certainly a waif; but in regard to the first bird, taken in June, 1856, while we have no account of its bodily condition at death, of the contents of its gizzard, of its weight, and of other important details, albeit the idea of its being a straggler is strongly negatived by the fact that it was in splendid song at the time that it was obtained. "It rose up from some willows after the manner of Flycatchers, and returned singing to the branch again" (Ussher, 'Birds of Ireland,' pp. 23, 24). It evidently was vigorous.

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* The records of rare Warblers and other birds from Light-stations, sent to the late Mr. Barrington, have been published by him from time to time in the pages of the 'Irish Naturalist' and other periodicals. They are conveniently summarised and afford a ready reference in the December number of the 'Irish Naturalist' for 1912, p. 233.

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* *Vide* my articles on "Wrens on Migration," etc.; "Grasshopper Warblers on Migration," etc.; "Spotted Flycatchers on Migration," etc. ('Irish Naturalist,' 1912, pp. 125 *et seq.*, 137 *et seq.*, and 193 *et seq.*; also "Diurnal Migrations," etc. 'Zoologist,' 1913, pp. 217 *et seq.*)

GENERAL GEOGRAPHICAL DISTRIBUTION.

With respect to the general geographical distribution of the Icterine Warbler, Saunders states: "In Norway the Icterine Warbler breeds up to a little beyond the Arctic circle, although in Sweden, Finland, and Russia its northern range is less extensive. Eastward, the Ural and the valley of the Tobol form its known limits, while further south it has been obtained at Lenkoran, on the western side of the Caspian. In Asia Minor, and south-eastern Europe as far as Malta, it is only known on its migrations to and from Africa—where it winters down to about 25° S. lat.; but in Sicily and on the mainland of Italy, where it arrives in April, it remains to breed; though Sardinia and Corsica are seldom, if ever, visited. In Central and Northern Europe, up to the Baltic Provinces, Denmark, Germany, Holland, and Belgium, it is common from the middle of May until autumn. In the north-east of France it is very abundant, and extends westward as far as the valley of the Seine, in and beyond which is found the next species, *H. polyglotta*,* often confounded with our bird both as regards specimens and nomenclature. The Icterine Warbler appears to be rare in Savoy and unknown to the westward. Both species meet in Tunisia."

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* It is interesting to note that *H. polyglotta*, the Melodious Warbler, a species closely-allied to the Icterine Warbler, and a bird which does not penetrate nearly so far north in Europe, the limit of its range being Normandy, north of which it only occurs as a mere straggler, has been taken a few times in the south of England, and once in Ireland, in Co. Cork. All these records are of recent date.

A DIARY OF ORNITHOLOGICAL OBSERVATION MADE IN ICELAND DURING JUNE AND JULY, 1912.

By Edmund Selous.

(Continued from vol. xix, p. 307.)

June 27*th*.—To-day, for the first time, I saw a Phalarope making that peculiar whirligig motion on the water which is said to constitute its nuptial or courting display. The particular bird thus acting when, at about seven in the morning, I looked out of my tent, was by itself, or, at any rate, there was no other one that I could see very near it. I hastily got hold of the glasses, but before I could get them properly focussed on the bird, it had left off. Annoyed at this, I continued to watch it perseveringly, and my perseverance was rewarded, for after some time had gone by, it began again, going round like a top, without changing its place on the water. Once or twice it varied the motion by jerking itself from side to side only, and then I thought I must have exaggerated the rotary one, but hardly had I begun to doubt when this was indulged in, again, as markedly as before. It was most extraordinary, and did not appear to me to have anything of the character of a display action, but suggested much more some form of nervous derangement such as the Dancing Mouse of Japan may be supposed to suffer from. Later, either this same bird or another flew over to the mouth of the little stream I have mentioned, and gyrated gradually up it—but there were, of course, swimming intervals. When he got out of sight I began to follow him, and it then appeared that he was accompanied, though I had not seen the partner bird before. I soon had the satisfaction of seeing them both waltzing in this bizarre manner, separately, indeed, but often near to one another. On two of these occasions one of the revolving birds seemed to think the proximity too close a one, for it flew at the other, who flew a little farther away, when both began to spin round again. I think it was the same bird that, each time, made the aggressive movement, but, as I could not observe any difference of size or coloration between them, I do not know whether it was the male or the female. I thought they must be of the same sex, but when one flew away the other followed, which suggested the nuptial tie. Whilst rotating in this peculiar way the birds, from time to time, pecked up something from the water which of itself might suggest that the motion is in some way related to feeding. The water just here is quite shallow, and once I am sure I saw one of the birds either standing or with its feet just touching the bottom. In this way, if they continued to do so during the actual gyrations, mud or weeds would be stirred, and this would be likely to bring minute aquatic creatures to the surface. The act of thus stirring the mud with its long dangling legs would send the bird round, and as soon as the motion had become a habit it would be practised anywhere, irrespective of food, though owing its origin to the attempt to procure this.

I could see but little of sexual activities amongst these Phalaropes, but sometimes there would be an aerial pursuit of one by another, and sometimes a flight of several, whether in the nature of so many little chases also I cannot say; it took place but seldom, and always at a considerable distance. Also one bird would sometimes fly over the water to another, who would rise and fly farther off just as this one was coming down. This, no doubt, was a nuptial touch, as with the Horned Grebes, as lately noted, and, indeed, with birds generally. The one sex seeks the other—usually the male the female—and an element of coquetry, or, let us say, erotic excitement, probably enters into the retreat of the latter. The only instance which I have yet seen of anything approaching imperiousness on the part of one sex towards the other, or that might be so interpreted, was when, as I have recorded, one of a hypothetical mated pair, that were both rotating, drove off the other on its coming too near. That was what it seemed. Assuming the correctness of the statement that the ordinary relations of the sexes are reversed in this species, and bearing in mind an observation made by Herr Mannicke in the case of the Grey Phalarope, the female may here have been trying to induce the male to fly to the shore to the end that coition might be there effected, and this, it is obvious, though suggested by peckings, is compatible with a fair amount of conjugal affection and happiness. It had not, however, that appearance. The idea it conveyed was simply that one rotating bird resented the too near approach of the other. Moreover, I was unable to catch in these curious revolutions any of those characteristic features with which I am acquainted in the true sexual display of birds, nor did they appear to me to be at all well adapted for showing off the plumage. Certainly no detailed display of it was made by these movements, nor were they justified by the general effect, which did not, by any means, exhibit the bird to the best advantage. In fact, there seemed no relation between the movements themselves and such beauty of plumage as the bird possesses, and, having myself seen Dancing Mice, I was at once struck with the similarity between the two performances, both seeming pathological in their origin. That this irrelevant and inartistic little whirligig, however originating, has now come to be a sexual antic is, I think, quite probable, but I cannot believe that it has been developed along the true lines of sexual selection. As will have been seen, it differs entirely from anything that might be described as a circling dance of one sex around the other. Possibly we see in it the degeneration of such a one, but these birds, at any rate, circled round nothing but their own axis, and, when they stopped, it was difficult to think they did so for any other reason than because they were giddy. The degradation of something rather than its legitimate development is suggested to my mind. I timed the duration of these St. Vitus-like dances on two or three occasions, and found that they lasted just a minute. I am convinced that they were sometimes much longer, but a minute is a good time to keep spinning round like a top. I ought to have timed them oftener, but it is very tedious doing so, as it is quite impossible to say which is going to be a longer or shorter performance, just as in counting the number of claps of the wings above its back, given by the Nightjar. Perhaps, however, three times (I think it was three) is sufficient to show the average length. I am sorry that I have not begun to watch these birds, in a special manner, earlier. They have been squeezed out, as it were, by others that, perhaps, are less interesting. It would appear that, in their case, the female is to the male what, according to the general rule, the male is to the female—in size, colouring and relative domestic habits, that is to say. But that is no evidence of the actual male being in a state of subjection to her, for the converse of this by no means represents what is ordinarily the case. That power belongeth unto the female, rather than the male, has indeed been more my experience. On the two occasions, when (as we will suppose) the male was ill-humouredly pecked at, he did not give me at all the idea of being under her tutelage. There was no sign of awe (save the mark!), he merely flew a little way off and went on feeding, as though very much unimpressed—just as a female Gull or Crow might have done under similar circumstances. "There, then, you old cross thing"—that was more the idea.

Though, owing to the predacious naturalist, I have been disappointed in not seeing the Icelandic Jer-Falcon, I to-day saw his handiwork—*viz.* the feathers, with the head and neck, of a male Mallard, lying on the river bank, as we came here. This exactly agrees with my experience of smaller findings in England —Starlings, Fieldfares, Finches, &c. The head, as I suppose, is in all cases pulled off before further transportal, for neither here nor elsewhere have I found anything but the feathers. Whether the victim is dead before its head is thus pulled off—whether this Duck was—would be all a chance. At any rate he must have been immediately afterwards; let the optimist think of that, not the process. Some of the details may be unlovely, but what would I not give to have seen the drama as a whole—the swoop and mighty rush of pinions down the darkening air, the fierce destruction and magnificent pose above the prey, the scattered feathers and triumphant bearing off of the plucked and decapitated body? (Detail again, but, outside humanity, I never would bowdlerise Nature.)

June 28th.—Whilst watching the Phalaropes, this morning, as they swam and caught Mosquitoes in the bay one flew towards another, and then, as by magic, the two became a little flock, which flitted about, for a minute or so, before coming down on the water, again. I say by magic, because at any distance these small birds are not easy to see, as they swim, so that when they rise from different parts (they do not feed closely) and come together into a flock, it seems to have formed itself out of nothing. The first flight (remarked by me) was at 8, perhaps, and, at about 9.30, there was another one. They have a pretty appearance, owing to the glancing of whatever there is of white in their small bodies, and the motion, too, is soft and graceful.

Do Phalaropes dive? The answer, as given by the lobed toes, would seem to be Yes, but, looking at them, one would not think so. They do not seem sufficiently aquatic birds for that. Nevertheless they must, for one or other of them will, from time to time, disappear in a manner which does not allow of another explanation. One of a pair just now, for instance, that I had the glasses full upon, was, all at once, not there. But I have not yet succeeded in seeing one go down.

The little flights are now becoming more frequent. First one bird will make a little scud over the water, then another, and then, all at once, the whole of them—perhaps a dozen—and all sweep together and delicately skim away. One bird has just flown close up to another one on the water, this other, a moment afterwards, flying a few yards off, and coming down again. I do not know if a peck, administered, had anything to do with this, but it is not at all necessary to suppose so. I have only once, up to now (11.55 a.m.) observed anything of the rotary motion, on the part of one bird only, and then it was very undeveloped, and lasted only a few seconds.

Besides Phalaropes in the water are Whimbrels on the shore, and these seem to bear the former no good will, for one has just flown out over the water with a hostile demonstration above them, which, for a moment or two, seemed as if it would develop into an actual attack. One of them evidently thought that it would, and, conceiving itself to be threatened, gave a violent start on the water, the points of its wings flashing out unevenly, in a dishevelled manner. This might be taken as evidence that the Phalarope does *not* dive, or surely this frightened bird would have done so. The Whimbrel, however, only flew just over him, and a little beyond, and then returned to his coterie. It was a sort of threatening stoop and demonstration, but for what precise reason it would be difficult to say; I have, indeed, a suspicion that there was none, but this is only a provisional hypothesis.

There are, on this lake, which is long and narrow, two pairs of Whooper Swans, one of which has two cygnets and the other, I think, three. There is also another pair, presumably uncygneted, who fly, at intervals, up and down the lake, from end to end, coming, I believe, from another beyond it, and returning into this again. These flights are magnificent to witness (for a Swan is as graceful, or at least, as lovely, in the air as on the water), and they give rise to some strikingly beautiful scenes. The two pairs of Swans belonging to the lake are always, with their respective families, widely separated, whether on the banks or the water—probably they share the ownership of both—and, as the childless pair pass first the one and then the other of them, both the parent birds send up loud, clear, ringing, musical cries, probably (judging by what I have seen and recorded in earlier entries) of protest and defiance.

"Yet it seems like a welcoming."

There was one example of this in the morning, and there has, just now, in the early afternoon, been another. In this last, the first pair of cygneted Swans, as the strangers sailed by, on rhythmically beating wings, confined themselves to melodious outpourings only, but one of the other pair, not satisfied with this, flew out from the bank against them, almost, indeed, engaging with one of them and turning them both from their planned course. Having acted thus worthily, it returned to its family, and a scene of rejoicing then took place between the two parents which passes description. The cries came ringing over the water, and the glasses showed the two lovely birds in a state of triumphant joyousness, their wings, like four broad silver banners, gloriously waving, and their proud necks upstretched. The cygnets, too, I thought, were excited, but they were too much concealed behind the bodies of their parents for me to see if they shared in their actions. When the stranger pair flew by again—for they were not to be permanently deflected—the same bird (presumably) pursued them on their course, but its return was not made the occasion of similar rejoicings. There were a few cries, indeed, but they were much less powerful, and soon subsided, nor did the two parents come close up to one another, as before. Fresh energy, I suppose, required to be stored.

These beautiful wild Swans seem to have both the conjugal and parental feelings strongly developed. They resent any approach (construing the term most widely) of any other Swan to their cygnets, fearing, as I believe, their appropriation. In this they may be well advised, for the Mute Swan, where the conditions admit of it, will incorporate any number of cygnets with its own brood, and the latter seem as ready to follow a foster as a natural parent. Thus in the Swannery at Abbotsbury families cannot long be kept separate, and many Swans are to be seen "with a tail on,"* of a dozen or twenty cygnets or more. It was the keeper's opinion, as expressed to me, that the more any bird could get, in excess of its own, the prouder and better pleased it was, and this was certainly borne out by the look and bearing of all those I saw that were leading these long strings of cygnets. It is indeed asserted—I suppose with truth—that the Mute or Polish Swan may have from six to twelve cygnets, but this I think must be uncommon. At any rate, I did not see a brood of more than six, even if there were any of that number—before they had taken to the water, that is to say before there was an element of doubt. But, at any rate, a following of fifteen or twenty—and many such were to be seen—is beyond the limits of the largest allotted quiverful.

Ravens are common in Iceland. There is a great glamour about this bird, which goes so far with some as to make them want to depose the Eagle in its favour; but then they must be mad or never have seen an Eagle flying, but that is what a glamour can do. As for me, I think I prize the bird at his true worth, but I have not been particularly lucky in regard to him—he has not yet given me of his best. He has never torn up the ground, for me, in impotent fury, or struck a Peregrine dead, in a happier outburst, or done anything preternaturally cunning or beyond the intelligence of another bird, of a Duck or a Curlew, for instance, though I admit he always looked as if it were—much—whatever it was. On the other hand, I have several times seen him cut a somewhat poor figure, and by as much as he was superior in himself, whilst he did so, by so much he cut it more poorly. This morning, for instance, he has flown from lake to mountain pursued by Terns and uttering pitiful cries as they struck at him, and, on his return, he was served in the same way by Whimbrels, though these, I think, were less unpleasant assailants, and his cries were not quite so plaintive. Again, in the Shetlands, I have seen him thus pestered by Skuas—the smaller kind—and only too glad to get away from them. Three Ravens, if I remember, flying together, were a good deal put upon in this way, and yet not a Skua was struck dead. Of course there is not much in this; Gulls, as has been seen, may tempt Eagles with equal impunity, but the two pictures presented are very different. The Eagle does not cry out in distress. It is magnificent to see him float majestically away from the canaille, not hurry with quick, frightened, undignifiedly flapping wings. Either thus in the air, or standing, stately, on some rock, with great bill raised to repel the impertinence, whilst stooped at and worried by Merlins, always and everywhere the Eagle, like King Lear, is "every inch a King." Depose him for the Raven! That would be "fine revolution," indeed, nor would it end there, for on that day—

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* See 'Waverley,' chap. xvi.

> ". . . . shall packhorses,
> And hollow, pampered jades of Asia,
> Which cannot go but thirty miles a day,
> Compare with Cæsars and with cannibals,
> And Trojan Greeks."

Leaving my tent about 3 or 3.30 in the afternoon, I went to the little pool at the head of the bay in which the creek, formed by the entrance of the hardly noticeable stream, commences. In the centre of it were two Phalaropes, one larger and much more brightly marked than the other. They approached one another, and when quite near, the smaller of the two went up, with a little flirt, from the water, flew a yard or so away, and went down on it again—and this was repeated before the birds noticed me. Here then were nuptial activities, but nothing in the nature of predominance on the one part and subjection on the other. The sudden start off of the male had nothing to do with fear, and the flight was a mock one made in a "catch me if you can" sort of spirit, coquettish in short, one and the same with such as I have recorded on the part of the Slavonian Grebes. I watched for some little time, having an umbrella, and gloves on, but no net round my hat. An umbrella very much lessens the plague of mosquitoes. It seems to puzzle them, the greater part do not come under it, and, of those that do, most fly at once to the top, where they stay. I saw nothing else in the nature of nuptial activities, but a Phalarope bathing was a pretty sight. It made a number of severely straight bobs up in the water, coming down again with equal precision, but the bobs were a good deal higher than those which a bird usually makes on such occasions. Also it bobbed in a more rigidly straight manner, and not with its head alone, but with its whole person, as a mallet would have to do, to bob *its* head, so that the bathing of the Phalarope is something of a unique affair. After bathing came preening. The bird got up upon a mossy cinder (for all the stones here look like, and I believe really are, cinders) to do it, and when it had continued for what seemed like a quarter of an hour, I thought of timing it, and it went on for another ten minutes by my watch. I noticed, or thought I noticed, that its feathers looked wetter than what is usual with ordinary aquatic birds, as if they were not so well provided with oil—not like a Duck's back.

Later, I defied the mosquitoes at this pool—which is a very pretty one—for another *mauvais quart d'heure*, hoping to see something more considerable of the loves of the Phalaropes, but the one bird there, when I came, was not joined by any other. This one, however, enforced my previous observation as to the damage done by this species to mosquitoes, for she was occupied solely in devouring them. They were caught on the water, on the bank and in the air, and often the mossy rocks over which they delighted to hover would be mounted for their sweet sakes. Other favourite resorts were little nooks or miniature creeks of the bank, and particularly where it overhung to any considerable extent, and as this was constantly the case, the bird would have been each time invisible except from the bank directly opposite it, where I sat. It entered more than once a veritable cavern that was formed in this way, and where many mosquitoes danced. "What's the good of mosquitoes?" "What were mosquitoes made for?"—a class of question not yet obsolete, amongst ourselves—would seem a sufficiently bizarre one to a Phalarope. These birds should be encouraged wherever mosquitoes are and are not wanted—by us. I should be glad of a flock of them in my tent to-night. The Red-necked Phalarope is common in Iceland and—as is commonly the case as between the preyed-on and preying on species, if man will let them both alone—so are mosquitoes.

The Redwing is here, in what may be called the bush country, a thick growth of birch trees, that is to say, dwarfed to that size, and modified into that appearance, growing over a series of intermingled pits and hillocks, the latter being in their foundation great heaps of stony cinders. What has caused the corresponding pits, unless they are the miniature craters from which these have been cast forth, I do not know. A pair of these birds have a nest not far from where I have finally pitched my tent, which is completely hidden now amongst the bushes. Not from them, however, and, up till to-day, their tactics in relation to the settlement have been as follows. Whenever I have gone outside the tent, they have dogged my footsteps in a state of excited apprehension, one of them, in particular, making a violent harsh chattering, whilst the other—I presume the male—has, from time to time, varied it with snatches of song which, though it may not be equal to that of our Thrush or Blackbird, I found pleasant enough to listen to. Or he would sit, for some time, quite silent in one of the birch-bushes—often surprisingly near me—with an expression—or appearance—of combined agitation, resolution and vigilant watchfulness, with which I very much sympathised. When, however, I had entered my tent, which commanded the bird's territory, so to speak, and from which I would gladly have seen something of their un-man-marred ways, they became, from that moment, invisible, save for some chance glimpse, perhaps, though the song was still sometimes to be heard. It was something like "be-dee, be-dee, be-dee" uttered quickly in a wild, sweet tone, having, by its generalised resemblance to that of more familiar members of the family, all woodland associations in it.

> "The trick of that voice I do well remember,"

I thought, and England came back to me strangely. To-day, however, neither bird has come near me whilst I have been about—save for one hurried glance, I have neither heard nor seen them, till now, at 9.45 a.m., the male is singing whilst I write this in my tent. This seems a curious change of tactics. That these birds have a brood of young I know, since I have seen both of them with food in their bills—sometimes whilst they scolded.

A female Merganser, with a perfect swarm of young, came into the bay to-day. Once one, and once two, were on her back. It was difficult to count them, as some would always be coming together or crossing one another, but I think twelve was the number, but possibly thirteen, and eleven as a minimum. Their motion over the water, as also their speed, was most surprising, for they often appeared to—and I believe really did—run upon it. The mother just pursued her course, the young following her. They would spread all about over the water, always seeming to be doing something, one could not say what. They never dived, but yet, I think, found something to feed upon. Then, as the mother began to get too far away from them, they would make little scurrying rushes, to catch her up, some from one direction, some from another, all converging to one point, till they were a closely packed crowd again. Independently of any special cause, however, their idea always seemed to be that there was great cause to hurry, after any short interval of not doing so. At one point the mother passed over a strip of sand, dabbled with water but too shallow for her to swim, walking like a duck, and her brood followed and ran upon the land just as they had been doing in the water. I certainly think they ran in the proper sense of the word, there.

June 29*th*, 1912.—Have just seen (about 8 a.m.) what might be interpreted as the call or summons or command of one of a pair of Phalaropes to the other to come away, but whichever of these it was, and from whichever of the two—male or female—it proceeded, it was not followed or obeyed. Again, one bird was meandering, in its usual way, on the placid surface (it is now a dead calm) of the lake, when another flew up to it and may possibly—but this I cannot say for certain*—have administered a peck or two; at any rate it came down right beside it and pressed upon it. It then flew to a short distance, but, the other one continuing to swim as before, quickly flew back to it and pressed upon it again. Then again it flew off to just about the same distance, but was no more followed this second time than it was the first. The called or summoned or commanded bird was deaf to call, summons or command, and showed a properly developed will of its own, in the enjoyment of which it was now left. Now if it was the male bird who thus failed to respond to the wishes—sexual or otherwise—of the female, where was the subjection on his part?—and, *a fortiori*, there would be none if it were he and not she who thus endeavoured to initiate a movement, even though unsuccessfully.

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* See, however, *post*, p. 67.

Just before this, four Phalaropes flew, one after the other, in aerial single file, the movements, turns, darts, &c., of all being identical and synchronously performed which had an odd, yet pleasing effect. It would, of course, be natural to suppose that the movements of the first bird were aped by the second, of the second by the third and of the third by the fourth, but surely, in that case, there should have been a perceptible interval of time between those of the first and fourth, if not of the first and second, &c., whereas they all seemed to me to take place at one and the same instant. All three, it may be said, however (but not, I think, truly), might have seen and followed the movements of the first. On either view we have to assume that three of the four birds wished or felt impelled to cut out exactly the same pattern in the air that a bird preceding them did, which, in itself, would be curious. Few probably will suppose that this was a case of aerial drill, and that cries of command (to me inaudible) equivalent to "Right-turn," "Left-turn," "Wheel," "Half-wheel," &c., were uttered, or such ideas in some other way signified, a theory, however, which, to my mind, is still more untenable when we seek to explain identical movements at one and the same instant of time, throughout a great crowd of flying birds—Starlings, for instance. Various considerations (such evidence as I have been able to gather in the course of much psychical reading being one of these) incline me to think it possible that beings may float, as it were, together in a sort of subliminal sea, by the waves and tides of which they may both, at any time, be swayed, and also, at any time act independently of. This may, of course, not be quite right, but it is better, in my opinion, to hazard a false hypothesis than to ignore a fact.*

Seven Phalaropes are now (10 a.m.) together on the water. One, all at once, makes a little sort of aerial jump out of it, coming down again some two or three yards away. Another flies to this one and then presses upon it, a little, as in the case I have just recorded. It does this several times, at varying intervals, but nothing comes of it. Each time, the bird so pressed upon swims a little away, until the general state of things reasserts itself, the particular episode dying out of them. Clearly then no particular subjection of the one sex to the other is apparent here. Then one bird amongst the little covey flies to another, that one jerks itself away, a third flies up, a fourth follows, and there is thus an ordinary little group of one or two of the one sex pressing amorously on one or two of the other, though here the ordinary rule may be reversed. This continues, the little followings end in little scurryings over the water, but not in what can be termed a flight, and this state of things re-enacts itself, once or twice, the birds spreading out between-whiles, and feeding over the water, as before. The two individuals first mentioned show a more distinct predilection. One presses more assiduously on the other, and follows it thus, in little jerks, then both turn, and the one that has been pressed upon presses in its turn, but not so pressingly, and this, or something of the kind, goes on for some little while, one bird always pressing more than the other, but nothing coming of it till they both get to the shallow shore, where much the same thing, with much the same outcome, continues. All this may suggest an approaching ripeness towards coition, but I see in it no hint of the subjection of one sex to the other, whichever be the one or the other, for the distance is too great for me to distinguish between them. It is the ordinary sexual interplay, even though the order of it be reversed. In the light of the above observations I see no reason to read a peck into the actions of that bird which, a little while before, pressed upon another in a very similar manner.* Is it, however, certain that these activities are of an amorous nature? May they not be bellicose and represent either an approaching or, at least, at any moment, possible combat between two males or two females, or else those peculiar formal movements into which, in many cases, warfare with birds is apt to degenerate? As to this I can only say that the general character of the movements was more suggestive of amativeness than of combativeness. It is somewhat curious, however, if the birds, when thus pressing on one another, were actuated by sexual desire, that that curious whirligig motion which is generally understood to be the courting display, *par excellence*, was not to be seen amongst them. Why, in that case, was it not called into play? Perhaps we have here an antic which is only beginning to come into fashion, and is as yet confined to a minority of individuals. This may be possible, but it cannot certainly be said that the antic itself is only in course of development, for nothing could have been more pronounced and finished than what I saw, albeit that it struck me as pathological. Say, however, that this is a false view, yet it was altogether wanting in certain characters so strongly impressed upon the true actions of sexual display, in birds, that, once seen, it must ever afterwards be either instantly recognised, or, as instantly, missed.

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* The problem involved in the fact is still more ignored, the reason, I think, being that whilst most scientific naturalists are "orthodox" scientists, very few psychical researchers are also naturalists. Wallace was, of course, a great exception, but he kept the two severely apart, nor do I judge him to have been a great watcher of animals, but, rather, a gifted handler. For two striking examples of the fact, or class of fact, itself, I would refer the reader to 'Three Summers among the Birds of Russian Lapland,' by Henry J. Pearson (1904), pp. 32–33, and to my own article, there referred to, in the 'Saturday Review' of August 1st, 1903.

June 30th.—To-day, having marked down the nest of a Whimbrel, I watched the bird on to it. This was in the morning. Coming again to my post of observation at about four in the afternoon, the bird, as I approached it (though I was by no means near) flew off the nest in quite an ordinary way, and, alighting at some hundred yards or so away from it, uttered, from time to time, its plaintive "wit-ty, wit-ty, wit-ty, wit-ty, wit-ty, wit-ty, wit-ty, wit-ty," for it ended now with "wit-ty," as throughout, not on the first syllable "wit." In quite a short time—less than ten minutes I should say—he (I afterwards concluded that this was the male) began to walk back to the nest.

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* See p. 64.

When at a certain distance from it, he flew past it, in a circling manner, giving it a wide berth, and alighted at some distance beyond it, and from here walked on to it. He did not come up to the nest in a stealthy manner, and did not crouch, and, in sitting, held his head well up, though his whole attitude on the nest was not nearly so upright as that of the Golden Plover that I watched; neither was there the same immobility, the head being freely moved. During all the time that the male sat, the female Whimbrel stood about, at some two hundred yards or so from the nest, and uttered, occasionally, the same plaintive note, but, on the whole, was silent. Upon someone passing, though not at all near, the male again flew up from the nest, and his manner of returning to it, and deportment during the interval, as well as the length of this, were just as before. The female still kept approximately in the same place, and again, once or twice, uttered her plaintive cry, but, for the most part, sat silent and invisible, in the grass. Some cows now began to browse down in the direction of the nest, and one of them coming straight towards it, the sitting bird again flew up, this time closer to the ground than before, and without going so far. The cow came up, smelt at the top piece of turf that had been placed, as a mark, behind the nest, and passed on, on the further side. The disturbed bird did not wait so long, this time, and, in returning, walked straight to the nest, and sat on it with its head turned, now, the opposite way. The female had, some time before this, flown some way to the other side of the nest—coming down no further away from it, however, than she had been before—and I have, since, neither seen nor heard her. It is now nearly 6 p.m., and the male Whimbrel still sits on the nest. After this, the female gave some low subdued "wit-tees" and, towards 7.30 p.m., became, for some time, quite vocal, walking about, at the same time, and I thought she would now go to the nest, and that I should see the change upon it, but in this I was disappointed. Instead of going towards the nest she came towards me and sat on some cut turves almost under me. I, being on the turfed-up eaves of a small cow-shed, had a splendid view of her, standing thus and crying, but it was not what I wanted.

(To be continued.)

THE PHARYNGEAL TEETH OF FISHES.

By Colonel C. E. Shepherd (Indian Army).

(Continued from vol. xix, p. 457.)

Cymatogaster aggregatus. This fish came from Puget Sound, Washington State, U.S.A. It has twenty moderately long horny gill-rakers with soft bristles on them, and four rudimentary ones on the cerato-hypo portion of the first branchial arch. The longest one, at the angle, is about two-thirds of the depth of the gill-laminæ below it. There are six gill-rakers on the first epibranchial. The filter formed by the gill-rakers on the other arches is a very good one, and made in a similar manner to that described for the three preceding fishes. The upper pharyngeals show as one compact group of granular teeth going right across the top of the gullet. The lower pharyngeal bones are united and support a triangular group of similar teeth.

Pleuronectidæ.

This family consists of the so-called "Flat-fishes."

Psetta maxima (the Turbot) has triangular-shaped, stout, fairly long, horny gill-rakers which carry cardiform teeth. There are eleven of them from the angle forward on the first branchial arch, the first four being nearly of a size and about half the depth of the gill-laminæ underneath them. On the first epibranchial there are five slimmer gill-rakers decreasing in size, the upper ones very small; they carry teeth. The inner side of the first arch has only rudimentary traces of tubercles. On the outside of the second arch the gill-rakers are longish tubercles, and on the other arches the gill-rakers are round-shaped tubercles. All these tubercles are set with teeth. The upper pharyngeal teeth are in three groups of cardiform teeth. The upper group is elongate in form, on the head of the second epibranchial; the teeth are small but very closely set. The other groups are on the heads of the third and fourth epibranchial. The lower pharyngeal teeth are on two long, narrow plates set as a narrow, but irregular V, the right side limb being about twice as broad as the left side; the teeth are cardiform with a stouter row on each inner margin. The gullet was full of food which had evidently been masticated and torn up; it was matted on the gill-rakers, especially in the back part of the gullet on the left side. The food of the Turbot consists of other fish, crustaceans, and mollusks.

Hippoglossus vulgaris (the Halibut) has seven thick, long, upstanding gill-rakers on the first branchial arch on the cerato-hypo portion which bear prominent cardiform teeth at their upper half. The longest gill-raker is a trifle more in length than the depth of the gill-laminæ below it. There are shorter but similar teeth on the gill-rakers of the second arch. On the third and fourth arches the gill-rakers are tubercles which also bear teeth. There are no gill-rakers on the epibranchials. The upper pharyngeal teeth consist of a small group on the limb of the second epibranchial, just under the head, of six teeth in a single row, and on the head itself a line of seven teeth, on the head of the third epibranchial a group of eight teeth, six in a lower row and two above, and one group of eight teeth on the head of the fourth epibranchial; these are all strong cardiform teeth. The lower pharyngeal teeth are two rows of single cardiform teeth converging to form a V of elongated shape; there are a few smaller cardiform teeth at the apex of the V on the outer side. The gill-rakers stand apart and the filter formed is not a good one; there are no gill-rakers on the inner sides of any of the arches.

Hippoglossoides limandoides (the Long Rough Dab). On the first branchial arch in its cerato-hypo portion has eight horny gill-rakers standing rather far apart from each other; they are not toothed. The second and third arches also carry horny gill-rakers on their outer sides; the insides are smooth. The fourth arch has small tubercle gill-rakers both sides. The upper pharyngeal teeth are strong cardiform ones. The lower pharyngeal teeth are in a row on the edges of the lower pharyngeal bones and not carried over any kind of surface (fig. II. 1).

Solea vulgaris (the Sole) has no gill-rakers; there are a few minute papillæ, some six on the first cerato-hypobranchial, with two rather larger ones on the first epibranchial. There were four papillæ on the second arch, and five on the third arch on the cerato-hypo portion larger than those on the first arch. No filter was possible, unless formed by the arches closing together. The upper pharyngeal teeth are in three groups, one on the head of the second epibranchial, a larger one on the head of the third epibranchial, and one about the same size as that on the second epibranchial on the head of the fourth epibranchial. Each group consists of strong cardiform teeth. The lower pharyngeal teeth are on two long plates, forming a converging V in the mouth, that have cardiform teeth, but rather smaller than those of the upper pharyngeals.

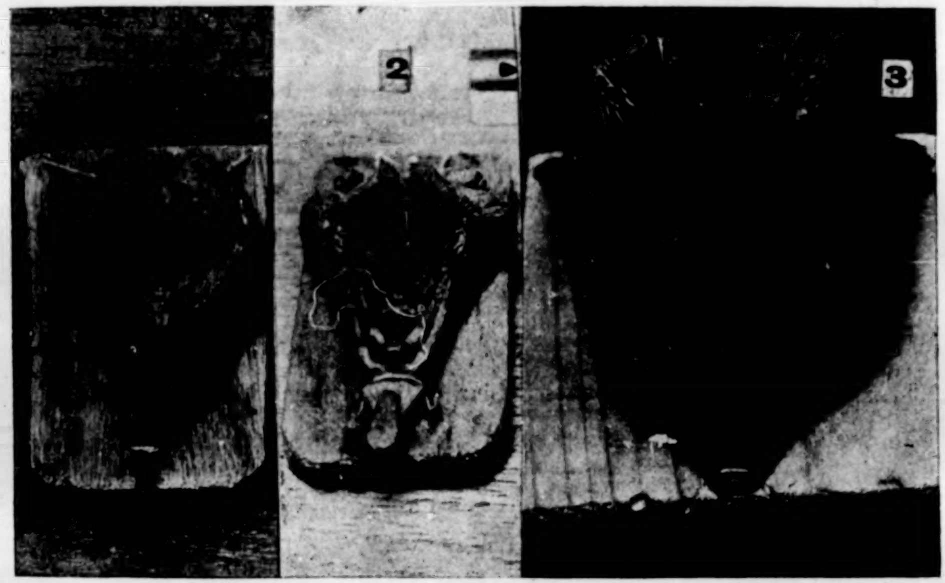

Fig. II.

Hippoglossoides limandoides. Echeneis naucrates. Lophius budegasa.

Kurtidæ.

Kurtus indicus, from the Indian Ocean, has eighteen long, horny gill-rakers on the first branchial arch, six of them being on the epibranchial portion. The longest is about twice the depth of the gill-laminæ below it. They are toothed, and speckled with little black dots along their length. The second arch has shorter horny gill-rakers. The third and fourth arches tubercles. This, although a small fish, is well supplied with pharyngeal teeth;

groups of comparatively large size are seen on the heads of t second epibranchial as well as on those of the third and fourt The lower pharyngeal teeth show in a elongated narrow V-shap

ECHENEIDIDÆ.

Echeneis naucrates belongs to the family known as "Suckin fishes" or "Suckers"; they have a curious elongated disc o the top of the head that enables them to attach themselve to ships, other fish, and turtles; and so they get carried along being themselves but feeble swimmers. The specimen examine had sixteen horny gill-rakers on the cerato-hypo portion of th first branchial arch, the last five being rudimentary. The othe gill-rakers are tubercular. The upper pharyngeal teeth are i two groups on each side of villiform teeth; the groups are larg for the size of the fish. The lower pharyngeal teeth are in tw triangular groups that meet closely in the middle line. There i a small oval patch of teeth on the basibranchials opposite th junctions of the first and second hypobranchials, and anothe patch at the junctions of the second and third hypobranchial (fig. II. 2.)

NOTOTHENIDÆ.

Trematomus hansoni has fourteen soft gill-rakers on the outsid of the first cerato-hypobranchial with nine on the epibranchial. The inside of the first, both sides of the second and third, an the outside of the fourth have shorter soft gill-rakers fitting well into each other and forming a close filter. The upper pharyngeal teeth show in three groups, the upper two crescentic, the lower approximately circular in shape. The teeth in these are so embedded in mucous membrane as not to show, but can be felt by pressing a finger-tip on them; they are cardiform. The lower pharyngeal teeth are in a broad V, similarly embedded. The stomach of the specimen examined was full of the remains of some shrimp-like crustacean in comparatively large lumps; mastication had been but poorly performed.

BATRACHIDÆ.

Batrachus surinamensis, the Pacuma of British Guiana, has ten small flat tubercles for gill-rakers on the first cerato-hypo-ranchial arch, and they carry teeth; four are placed on top of he outer margin and the other six, likewise on top, but inclined owards the inner margin. The other arches are provided with imilar gill-rakers. As for providing a filter to the water assing into the gills, they seem inadequate for the purpose. The pper pharyngeal teeth consist of a long, narrow strip on the econd epibranchial; a small group on the heads of the third nd fourth epibranchials with two rows of stout cardiform eeth, and a thin narrow line of smaller cardiform teeth on the imb of the third epibranchial. The lower pharyngeal teeth re arranged in two groups forming a crescent well advanced rom the œsophagus and having a broad division between them n the middle.

ZOARCIDÆ.

Zoarces viviparus (the Viviparous Blenny), in the specimen xamined, had nine small gill-rakers on the right side, and eleven n the left side on the cerato-hypo portion of the first branchial rch, those in the central position being upstanding; they ecome more diminutive as they get further forward. The other ranchial arches carry gill-rakers that fit in alternately and make n efficient filter. The upper pharyngeal teeth consist in their pper portion of a row of small but strong conical teeth set close ogether, then a dividing strip of mucous membrane and more onical teeth, but not as long as the upper ones. The lower haryngeal teeth consist of two groups of conical teeth meeting n the central line of the mouth, but with a well-defined line of eparation, the teeth in each group set in two rows, the inner ows being the stronger.

(To be continued.)

NOTES AND QUERIES.

MAMMALIA.

Barbastelle Bat (Barbastella barbastellus) in Wiltshire.—Through the good offices of Mr. H. W. Robinson, of Caton, Lancaster, I received, on October 21st, 1915, seven examples of the Barbastelle bat. These bats had, by the direction of Mr. Robinson, been taken by Mr. G. Gunning, Easton Farm, Sherston, Malmesbury, Wilts, and reached me alive. I was much struck by the very peculiar "hissing" noise made by the bats when disturbed, and this fact has already been recorded by Mr. Charles Oldham in 'The Zoologist' for 1908, pp. 391–2.

These seven examples proved to be five females and two males, all of which appeared to me to be adults.

This record constitutes, so far as I am able to gather, the second record for the occurrence of the Barbastelle in Wiltshire, the only previous record being a single example obtained at Salisbury in 1869 and recorded by Mr. Blackmore in 'The Zoologist' for that year, p. 1558 (Barrett-Hamilton, 'History of British Mammals,' p. 213).

I am pretty sure Mr. Robinson, whilst staying down at Malmesbury, killed another specimen of the Barbastelle; but, unfortunately, the example was sent to a taxidermist, and it arrived in too far gone a state to be preserved.

It is interesting to note that a lapse of forty-six years has expired since the last specimen of the Barbastelle was recorded from Wiltshire, and surely this shows how very scanty is the knowledge of Bat-distribution in Great Britain. Our knowledge of Bats here in North Lancashire, Westmorland, and Cumberland is very limited indeed, and I would only be too pleased if fellow naturalists would turn their attention to the bats in their respective neighbourhoods and forward me any they may capture.—F. W. SMALLEY, F.Z.S., M.B.O.U. (Challan Hall, Silverdale, Nr. Carnforth, Lancs.).

AVES.

Bird Notes from South Wales.—*January* 23rd: Fourteen White-fronted Geese in Thaw valley. 27th: About 70 wild geese (species undetermined) in same district. 29th: Flock of over 100 wild geese flew over Cardiff. *February* 27th: When out snipe-shooting I found plenty of "full" birds, but every Jack appeared to have left the moors. *March* 19th: Several Goldfinches and Lesser Redpolls feeding together in Sophia Gardens, Cardiff. 27th: Sandmartins, a Chiffchaff and a Barn-Owl in Thaw valley. *April* 3rd: Willow-Wren in Thaw valley. 5th: 5 Buzzards near Rhyader; flocks of 10 Curlew and 30 Golden Plover in same district. 6th: Swallows and Sandpipers at Abergavenny. 14th: Cuckoo near Lisvane. 23rd: Swift and Redstart at Abergavenny. 26th: Hawfinch in Sophia Gardens, Cardiff. 28th: Tree-Pipits in Rhymney valley. *May* 1st: Landrail and Yellow Wagtail in Thaw valley. 5th: Whinchat at Marshfield; House-Martins at Abergavenny. 7th: Blackcaps and Whitethroats near Taffs Well. 9th: Spotted Flycatcher at Llandaff; Whimbrel flying over Cardiff. 11th: Lesser Whitethroat at Usk. 15th: 15 Whimbrels flying over Thaw valley; 2 Herons' nests (4 eggs; 4 young); 3 Moorhens' nests (7, 6, and 3 eggs); Jay's nest (2 eggs). 22nd: Reed-Warbler in Thaw valley. 28th: Red-backed Shrike near Pontrilas; Mayfly up well on Monnow. *June* 1st: Turtle-Dove at Cardiff. *July* 3rd: 4 species of Wagtails (White, Pied, Grey, and Yellow) at Llangorse; Nightjar over lake. 4th: In evening saw on lake 12 Great Crested Grebe, 5 Tufted Pochard and family of 10 strong flappers; enormous flocks of Starlings, Swallows, and Pied Wagtails roosting on reeds. 5th: Buzzard near Talgarth; Curlew's nest near Bronllys. 6th: 6 Common Terns visited Llangorse Lake. 8th: Saw 7 young Wheatears, Red Grouse, and my last Cuckoo on Llangorse Mountain. *August* 2nd: 2 Teal on Llangorse Lake; I do not think they ever breed here. 4th: Whilst I was waiting on the lake for the evening duck flight sport was badly handicapped by an enormous flock of Sand-Martins, which seemed determined to roost on one particular bed of reeds; many actually settled on the boat, and others hovered over the gun-barrels. 8th: Nuthatch at Llangorse; I saw altogether 71 species of birds in this district. 13th: Raven on Black Mountains. 17th: Plenty of Swifts about; all left on the following day. *September* 12th: Wheatears and Spotted Flycatchers still in Thaw valley. 13th: Shot a Red-legged Partridge, and saw Corn-Bunting, Barn and Tawny Owl near Hereford. 25th: Shot last Landrail of year. *October* 6th: Owl hooted several times about 2 p.m. near Brecon. 11th: Saw over 100 Swallows and a late Whinchat near Pontrilas. 17th: Jack-Snipe re-appeared; shot 4 in one field. *November* 6th: 3 Swallows in Thaw valley; first Woodcock of season in; shot a brace. 20th: Great Spotted Woodpecker near Llantrithyd. 23rd: 12 Bullfinches near Pentyrch.—SIDNEY W. WHITE (Cardiff).

Bird Notes from the Bavarian Tyrol in 1910–11.—Whilst travelling out to, and during my stay in, the Bavarian Tyrol on the way to Ober-Ammergau for the Passion Play, I was able to make the following observations. On June 28th, 1910, on the journey through Holland, I noted the following birds: many Common Gulls and some Black-headed Gulls near the Hook of Holland; further inland Herons, Grey Wagtails, Common Sandpipers. Close to Würzburg I saw a pair of Hoopoes near the river. On June 30th, at Partenkirchen, Bavaria, I saw Cole and Marsh Tits, Common and Black Redstarts, and some Grey Wagtails. On July 1st I found a Robin's nest with five eggs; Common Redstarts were numerous, and I saw a few Black Redstarts. I also saw on that day a Lesser Whitethroat and some Carrion Crows. On going over to Ober-Ammergau, some nine or ten miles distant, I saw a pair of Black Redstarts feeding their young in a nest somewhere high up on the inside of a roof of the out-of-door theatre during the performance of the Passion Play; the cries of the young were most noticeable. Whinchats were numerous in the river valley between Partenkirchen and Ober-Ammergau, and, in fact, during all our stay in these parts they were the most numerous of all species, and were constantly seen feeding their fully-fledged young. On July 6th I saw several Black Redstarts, and on the 7th one Buzzard and two Ravens near Elman; also a hen Black Redstart feeding the young in a hole in the low roof of one of the picturesque wooden houses. On the way back we noted two more Buzzards, one flying very low, so that we were able to get a very good view of the rounded effect of the end of the wing. We also saw one male Red-backed Shrike. We found another nest of young Common Redstarts on July 8th. On July 10th we had one of the most interesting days from an ornithologist's point of view, for we met with two birds which are unfamiliar to anyone living in these islands—namely, the Great Black Woodpecker and also the Alpine Chough. It was on the way up to the Kreuzeck that we saw the Black Woodpecker, and at the same time we saw his more familiar relative, the Great Spotted Woodpecker. On reaching the hut at the Kreuzeck I was startled by a curious chattering sort of call proceeding from the cliff near by, and on hurrying in that direction I was delighted at seeing a pair of Alpine Choughs fly out quite near to me, so that I was able to note their bright yellow bills. Three more Buzzards were seen this day, and also some Goldcrests. Travelling home from Bavaria by way of Innsbrück and the Vor Arlberg Railway, and the Lake of Constance, little was noted except a few Black-headed Gulls. A pair of Storks were seen on their nest on the roof of a cottage soon after passing the Black Forest. The weather was extremely bad that summer, being wet nearly every day, which probably accounted for our not seeing more birds. In 1911 I again visited the same part of the Bavarian Tyrol, and this time the weather was extraordinarily hot and fine, and, with the exception of a few thunderstorms, we had no rain. We were also a little later in the year, and our list of birds was considerably lengthened. We saw again many Whinchats; Redstarts, both Common and Black; and numbers of Swallows. On August 18th I went up the Höllenthalklamm, where I saw three Wall-creepers on a rock, and was able to note the beautiful grey plumage with the crimson patch on the wing. I also saw White Wagtails on the mill-stream at Partenkirchen and elsewhere. This beautiful bird takes the place of our Pied Wagtail in these parts, and seemed just as plentiful. On the 19th I saw a specimen of the Little Owl (*Athene noctua*), stuffed, in a shop in Parmisch. On asking the owner, he told me that it had been shot in the woods near. On my way out I had seen this bird perched on a telegraph pole close to the Hook of Holland. On the 21st I went up the Fauken, where there was a pair of Grey Wagtails, and I also came across, for the first time, the Crested Tit, which is said to be numerous in the woods near there. Next day I saw a pair of Dippers on a very rapid mountain stream, three Buzzards, and a Raven. On the 25th I saw the first Nutcracker, a bird which is fairly common in this part of Bavaria. I again and nearly every day saw White Wagtails, Goldcrests, and Marsh Tits. On the 28th we went up a low mountain called the Krottenkopf, where we got a sight of nineteen Chamois feeding; this was at 5.30 a.m. Later in the day we saw two Golden Eagles. On the 31st we saw two Kestrels, three Buzzards, Grey Wagtails, Nutcrackers, and a Little Grebe on a small lake near Eckbauer. On September 1st, on going up to the Kreuzeck, close to the same place as last year, I again saw the Great Black Woodpecker, as well as Buzzards, Jays, several Nutcrackers, and Crested Tits. We climbed the Zugspitz on September 2nd and 3rd. This is the highest mountain of Bavaria, close on 10,000 feet, and I was much interested in seeing about twelve Alpine Choughs on the summit; they seemed fairly tame, and we were able to approach quite close to them. Amongst many Swallows' nests which we found, the following was very interesting. A small shelf was put up in the main passage of a farm house leading from the front door, and on this shelf a pair of Swallows had made their nest and were rearing a family of young, even though only a few inches above the heads of everyone passing, as the passage was very low. Returning to England *viâ* Innsbrück and the Lake of Constance, I had a fine sight of an Osprey fishing on the lake. There were also many Gulls, Terns, and flocks of Duck, though I was never able to get near enough to identify the latter.—(Miss) Clemence M. Acland.

Female Carolina Duck in Male Plumage.—There is at present on the Three-Island Pond at the Zoo a female Carolina Duck (*Aex sponsa*) which has assumed the plumage of the male to a remarkably complete extent. The general effect is duller, especially as regards the gloss on the head, and the markings less clearly defined, but on the whole the difference from the male is not greater than that seen in the female common Sheldrake (*Tadorna vulpanser*). The glossy parts, however, are more bronzy than in the drake, and the wing-coverts show the black tippings only found in the female. The bill, eyelids, and eyes are feminine in colour, and the legs, though more orange than in a normal female, are not so bright as a male's. A little time back another Carolina duck at the Zoo assumed male plumage, but less completely than the present bird; she never looked well, and is now dead, whereas the present bird seems healthy and vigorous. In this second specimen the eyes and bill were also feminine.—F. Finn.

REPTILIA.

Hardiness in a Chameleon.—On the afternoon of November 13th a fine large specimen of the Common Chameleon (*Chamælæon vulgaris*), ten and a half inches in length, and apparently in good health, was brought to me by a gentleman who had found it on a plum tree in a garden at East Dulwich. It is somewhat difficult to keep a chameleon in the cold weather, and it seems noteworthy that this individual should have been in an almost normal state of activity after being even a short time in the (at that time very cold) open air in November, though we have no means of knowing how long the animal had been at large. About three weeks after it was brought to me the animal passed a whitish-yellow fæcal mass, and also a large dark mass, $1\frac{2}{12}$ in. in length and $\frac{5}{12}$ in. in thickness. The latter mass was found on examination to be wholly composed of the remains of blow-flies, amongst which I counted 21 heads. The Chameleon is being kept in a room which has a temperature of about 50–55° F., and is still (January 23rd) alive and active, though it has not yet taken any of the Stick-Insects which have been offered to it as food. When captured the animal was of a dark brownish colour, but on being brought to the fire it turned to a bright yellowish-green with several light lilac patches on each side. It may also be remarked that the side of the animal near the fire turned of a light colour more rapidly than did the other side. The general colour of the animal since its capture has varied from dark green to light yellowish-green, and at no time have I seen it resume the dark brown colour.—H. N. MILLIGAN.

CRUSTACEA.

Hermit-Crabs Changing Shell in Face of Danger.—In September of 1915 I put several examples of the Common Hermit-Crab (*Eupagurus bernhardus*) into an aquarium which already contained two average-sized and pugnacious Shore-Crabs. Five Hermit-Crabs, whose stained and battered shells were easily to be distinguished from the clean whelk shells which were present in the aquarium for the use of the newcomers, had been dropped into the tank, when the Shore-Crabs proceeded to attack the Hermit-Crabs and to try to pull them from their shells, in which efforts, however, they were not successful. I had turned away, for only about a minute or a minute and a half, in order to examine further into the contents of the collecting-can in which the Hermit-Crabs had travelled, when my attention was called by an attendant to the behaviour of the Hermit-Crabs in the tank. Two of them had quickly changed into new shells, and I was in time to see them retreating across the floor of the tank in front of a demonstrative Shore-Crab. Perhaps the Hermit-Crabs had been ready to change shells at the time they were captured at the seaside; they had been so much alarmed by the attacks of the Shore-Crabs in the tank that they had preferred to take the momentary danger of the change from shell to shell to withstanding the attacks of their enemies. The difference in size between the old and the new shells was by no means marked, and this raises some perplexing questions, *e. g.*, *By what means were the Hermit-Crabs able to decide so rapidly that the new shells were to be preferred to the old ones?* Hermit-Crabs are so commonly kept in aquaria that observations should be fairly plentiful, and it would be of interest to know what facts similar to those mentioned above have been recorded in the note-books of those who keep marine aquaria.—H. N. MILLIGAN.

ASTEROIDEA.

Cushion-Stars Attacking Brittlestars.—On the afternoon of March 3rd, 1915, I obtained three individuals of the Common

Brittlestar (*Ophiothrix fragilis*), each of which was about four inches in diameter, in a dredge on the coast of Essex. During the journey to London in the collecting-can the Brittlestars amputated their arms close to their discs. The mutilated Brittlestars were, however, placed in an aquarium, as I had often been able to keep such injured specimens during the regeneration of their arms. In the same aquarium there were several examples of the Cushion-Star (*Asterina gibbosa*), of about one and a quarter inches in diameter. On the following morning (4th) I found that a Cushion-Star had enveloped one of the Brittlestars in its arms, and on the 5th there was nothing to be seen of the ophiuroid except fragments of skeleton. The remaining two Brittlestars were destroyed by the Cushion-Stars during the next two or three days.—H. N. Milligan.

ANTHOZOA.

Opelet Sea-Anemone Temporarily Attached to Shore-Crab.—On November 13th I found that a Shore-Crab (*Carcinus mænas*) which was confined in an aquarium with a number of examples of the Opelet Sea-Anemone (*Anthea cereus*) had one of the Sea-Anemones attached to its abdomen. The Sea-Anemone measured about two inches across its extended tentacles, and the Shore-Crab about six inches across its extended legs. The Sea-Anemone was attached by its base to the lower and hinder part of the abdomen in such a way that its disc and tentacles dragged behind the Shore-Crab when the latter walked on the floor. I do not know when the cœlenterate attached itself, but it must have been at some time between the afternoon of the 12th and 9.15 a.m. on the 13th. It was attached with some firmness to the Shore-Crab, but it became detached from the crustacean during a fight which the latter had with another Shore-Crab at feeding time, about 9.30 a.m. It may reasonably be conjectured that the Shore-Crab had sat for some time over the Sea Anemone whilst the latter was attached to the rock by its tentacles alone, its base being free and directed upwards, as occasionally happens when the Sea-Anemones are moving from one place to another. The Sea-Anemone had then attached itself by its base to the motionless Shore-Crab, just as it would have attached its base to another part of the rock. The Shore-Crab displayed no signs of uneasiness in regard to its burden. This occurrence is interesting, because it may perhaps illustrate one of the stages through which such Sea-Anemones as *Sagartia parasitica* have passed in the course of their evolution into commensal forms.—H. N. Milligan.

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